Docket No.: 1023-016US01

CLAIMS:

1. A method for charging an energy storage device associated with a defibrillator, the method comprising:

applying current to a primary coil in a flyback transformer; sensing an average current through the flyback transformer;

controlling the applied current to cause the average current to follow a reference current; and

transferring energy from the flyback transformer to the energy storage device.

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2. The method of claim 1, wherein controlling the applied current to cause the average current to follow a reference current comprises:

determining the difference between the average current and a reference current; and controlling the applied current as a function of the difference.

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型型 型 型 型 型 20 3. The method of claim 2, wherein controlling the applied current to cause the average current to follow a reference current further comprises:

generating an error signal as a function of the difference; comparing the error signal to a time-varying clock signal; generating a modulation signal as a function of the comparison; and controlling the applied current with the modulation signal.

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4. The method of claim 1, wherein transferring energy to the energy storage device comprises charging a capacitor.

- 5. The method of claim 4, further comprising adjusting the reference current as a function of the voltage across the capacitor.
- 6. The method of claim 1, further comprising supplying the applied current from a voltage source.

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- 7. The method of claim 6, further comprising adjusting the reference current as a function of the voltage across the voltage source.
- 8. The method of claim 1, wherein sensing an average current through a flyback transformer comprises:

sensing the current through the primary coil of the transformer; and sensing the current through a secondary coil of the transformer.

- 9. The method of claim 8, wherein sensing an average current through a flyback transformer further comprises summing the current through the primary coil and the current through the secondary coil.
- 10. A device for charging an energy storage device associated with a defibrillator, the device comprising:

an energy source; and

a charging circuit that transfers energy from the energy source to an energy storage device, the charging circuit including a flyback transformer, wherein the charging circuit transfers energy to the energy storage device as a function of the average current in the flyback transformer.

- 11. The device of claim 10, wherein the energy storage device comprises a capacitor.
- 12. The device of claim 10, wherein the energy storage device comprises a capacitor bank.
- 13. The device of claim 10, wherein the energy source comprises a battery.
- 14. The device of claim 10, wherein the energy source comprises a regulated dc source.
- 15. The device of claim 10, further comprising: 30 electrodes for delivering a defibrillation pulse to a patient; and

a switch that couples the electrodes to the energy storage device to deliver the defibrillation pulse.

- 16. The device of claim 10, further comprising a switch that regulates current applied to a primary coil in a flyback transformer.
 - 17. The device of claim 16, further comprising a controller that controls the switch to cause the average current to follow a reference current.
- 10 18. The device of claim 17, wherein the controller comprises:
 - a summer that generates an average current as a function of the sum of the applied current and a current in a secondary coil in the flyback transformer;
 - a difference circuit that generate an error signal as a function of the difference between the average current and a reference current; and
 - a comparator that compares the error signal to a time-varying clock signal and generates a modulation signal as a function of the comparison.
 - 19. The device of claim 17, wherein the controller comprises a processor that controls generation of a reference current.
 - 20. The device of claim 10, further comprising:a first sensor that senses the current in a primary coil of the transformer; anda second sensor that senses the current in a secondary coil of the transformer.
- 25 21. A medical device comprising:
 - a transformer;
 - an energy source that supplies energy to a primary coil of the transformer;
 - a switch that regulates the supply of energy to the primary coil;
 - an energy storage device that receives energy from a secondary coil of the flyback
- 30 transformer; and

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a controller that controls the switch as a function of the average current in the transformer.

- 22. The device of claim 21, further comprising a diode interposed between the energy storage device and the secondary coil of the flyback transformer to prevent discharge of energy from the energy storage device.
- 23. The device of claim 21, wherein the energy storage device comprises a capacitor.
- 10 24. The device of claim 21, further comprising:
 a first sensor that senses the current in the primary coil; and
 a second sensor that senses the current in the secondary coil.
 - 25. The device of claim 24, wherein the first sensor supplies a primary signal to the controller as a function of the current sensed in the primary coil, and the second sensor supplies a secondary signal to the controller as a function of the current sensed in the secondary coil.
 - 26. A medical device comprising:

a difference circuit that generates an error signal as a function of the difference between a reference current and an average current in a transformer that transfers energy to an energy storage device;

a modulator that modulates the duty cycle of a control signal as a function of the error signal; and

a switch that regulates the supply of energy to a primary coil of the transformer according to the control signal.

- 27. The device of claim 26, wherein the control signal has a constant period.
- The device of claim 26, wherein the modulator comprises: a clock signal generator that generates a clock signal; and

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a comparator that generates the control signal according to the relative magnitudes of the clock signal and the error signal.

- 29. The device of claim 28, wherein the clock signal comprises a periodic ramp signal.
- 30. The device of claim 26, further comprising a driver that operates the switch according to the control signal.
- 31. The device of claim 26, further comprising a processor that generates the reference current.
 - 32. The device of claim 31, wherein the processor generates the reference current as a function of the energy transferred to the energy storage device.